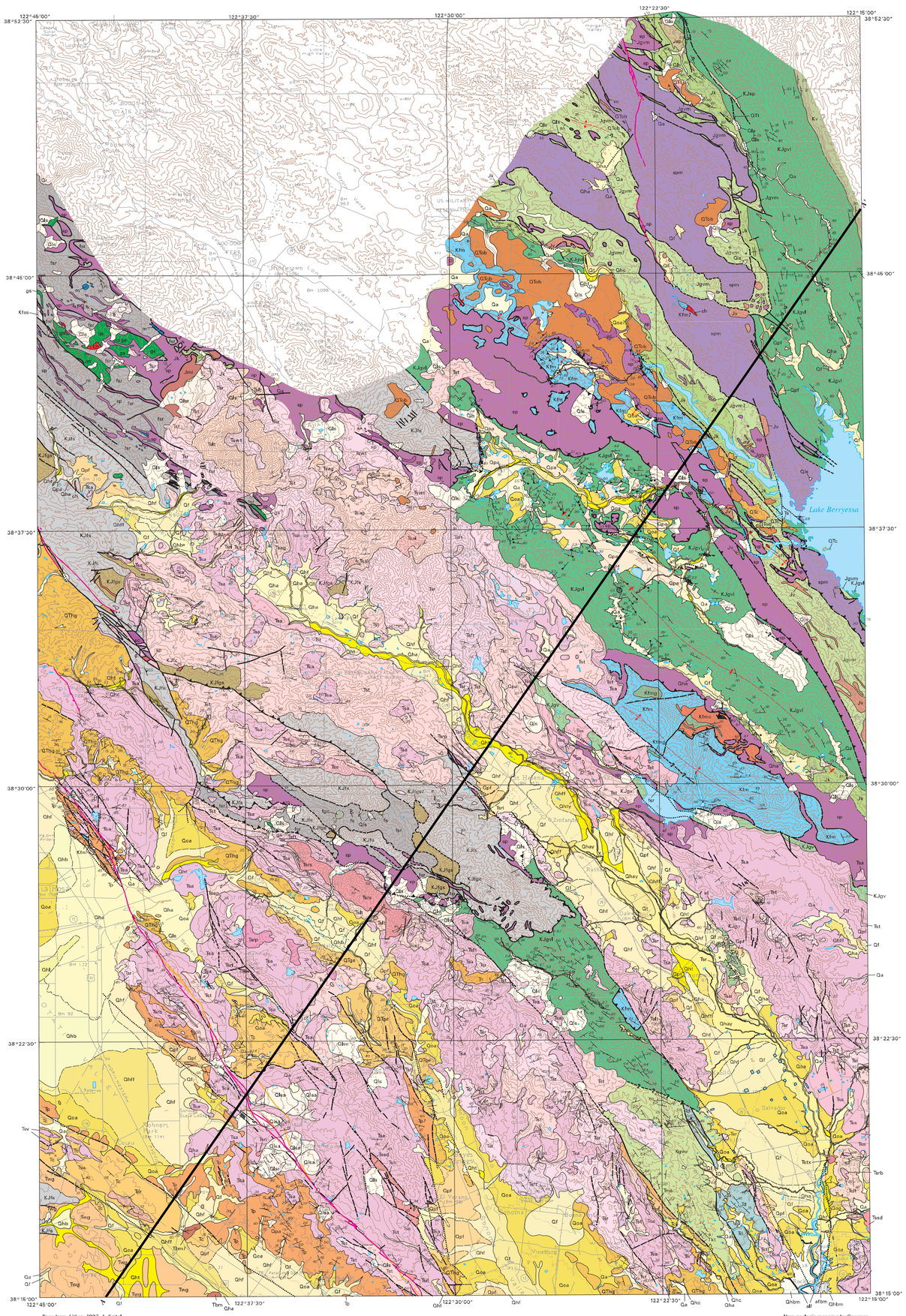
U.S. Department of the Interior
U.S. Geological Survey

Scientific Investigations Map 2956
Pamphlet accompanies map



Base from Airtkon, 1997, A digital version of the 1970 U.S. Geological Survey San Francisco Bay Region 1:125,000 scale topographic map

UTM projection, zone 10

APPROXIMATE MEAN DECLINATION, 2006

SCALE 1:100 000

Contour Interval 100 feet

MAP LOCATION

New geologic mapping by Graymer, Jones, Brabb, Barnes, and Stamski, 1999-2003

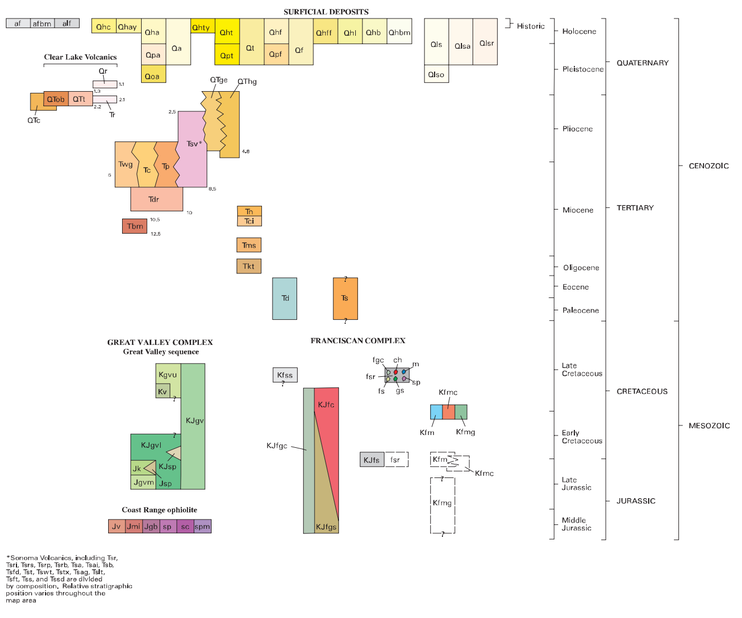
Digital data and cartography prepared using ArcInfo 9.1 running under Solaris 2.6 on a UNIX workstation

Edited by Theresa Ikl

Manuscript approved for publication December 21, 2006

CORRELATION OF MAP UNITS

[Numbers, radiometric ages (Ma), see Description of Map Units in pamphlet for specific age data. For mélange and metamorphic units, position of boxes with solid boundaries indicates age of assemblage or metamorphism, respectively; position of boxes with dashed boundaries indicates age of protolith.]



* Sonoma Volcanics, including Tsr, Tsrl, Tsrs, Tsrp, Tsrb, Tsa, Tsaa, Tsab, Tsfd, Tst, Tswt, Tstx, Tsag, Tslt, Tsfl, Tss, and Tssd are divided by composition. Relative stratigraphic position varies throughout the map area

LIST OF MAP UNITS

[Some unit exposures on the map are too small to distinguish the color for unit identification. These units are labeled where possible, and unlabeled units are attributed in the database.]

SURFICIAL DEPOSITS

af — Artificial fill (Historic)
afbm — Artificial fill over Bay mud (Historic)
aff — Artificial levee fill (Historic)
Qhc — Stream channel deposits (late Holocene)
Qhay — Younger alluvium (late Holocene)
Qhty — Terrace deposits (late Holocene)
Qha — Alluvium (Holocene)
Qht — Terrace deposits (Holocene)
Qhf — Alluvial fan deposits (Holocene)
Qhff — Fine-grained alluvial fan deposits (Holocene)
Qhl — Natural levee deposits (Holocene)
Qhb — Basin deposits (Holocene)
Qhbm — Bay mud (Holocene)
Qa — Alluvium (Holocene and late Pleistocene)
Qt — Terrace deposits (Holocene and late Pleistocene)
Qf — Alluvial fan deposits (Holocene and late Pleistocene)
Qls — Landslide deposits (Holocene and late Pleistocene)
Qlsa — Andesitic composition
Qlsr — Rhyolitic composition
Qpa — Alluvium (late Pleistocene)
Qpt — Terrace deposit (late Pleistocene)
Qpf — Alluvial fan deposits (late Pleistocene)
Qoa — Alluvium (late and early Pleistocene)
Qlso — Landslide deposits (late and early Pleistocene)

Clear Lake Volcanics

Qr — Rhyolite (Pleistocene)
QTob — Olivine basalt (Pleistocene and Pliocene)
QTt — Tuff (Pleistocene and(or) Pliocene)
Tr — Rhyolite (Pliocene)
QTc — Cache Formation (Pleistocene and(or) Pliocene)
QTge — Glen Ellen Formation (early Pleistocene? and Pliocene)
QThg — Huichica and Glen Ellen Formations, undivided (early Pleistocene? and Pliocene)

Sonoma Volcanics

Tsv — Sonoma Volcanics, undivided (Pliocene and late Miocene)
Tsr — Rhyolite flows
Tsrs — Rhyolite plugs
Tsrs — Soda rhyolite flows
Tsrp — Perlitic rhyolite
Tsrb — Rhyolite breccia
Tsa — Andesite to basalt lava flows
Tsad — Andesite to dacite plugs
Tsb — Basalt flows
Tsfd — Basalt or andesite lava flows and sediments
Tst — Pumiceous ash-flow tuff
Tswt — Welded ash-flow tuff
Tstx — Tuff(?)
Tsag — Agglomerate
Tslt — Tuff breccia
Tsfl — Tuff
Tss — Volcanic sand and gravel
Tssd — Diatomite
Twg — Wilson Grove Formation (late Pliocene to late Miocene)
Ts — Sand and gravel of Cotati (Pliocene and late Miocene)
Tp — Petaluma Formation (early Pliocene and late Miocene)
Tdr — Donnell Ranch Volcanics (late Miocene)
Tn — Neroly Sandstone (late Miocene)
Tci — Cierbo Sandstone (late Miocene)
Tbm — Burdell Mountain volcanics (late and middle? Miocene)
Tms — Unnamed sandstone (middle Miocene)
Tkt — Kirker Tuff (early Miocene and(or) Oligocene)
Td — Unnamed sandstone (Eocene and Paleocene)
Ts — Unnamed sandstone (Eocene? or Paleocene?)

GREAT VALLEY COMPLEX

Great Valley sequence

KJgv — Sandstone, shale, and conglomerate (Late Cretaceous to Late Jurassic)
Kgvu — Sandstone, shale, and conglomerate (Late Cretaceous)
Kv — Venado Formation (Late Cretaceous)
KJgvl — Sandstone and shale (Early Cretaceous and Late Jurassic)
KJsp — Sedimentary serpentinite member
Jk — Knoxville Formation (Late Jurassic)
Jsp — Sedimentary serpentinite member
Jgvm — Mélange

Coast Range ophiolite

Jv — Basaltic pillow lava and breccia (Jurassic)
Jmi — Mafic intrusive complex (Jurassic)
Jgb — Gabbro (Jurassic)
sp — Serpentinite (Jurassic)
sc — Silica-carbonate rock
spm — Serpentinite-matrix mélange

FRANCISCAN COMPLEX

fsr — Mélange, including blocks, mapped locally, of:
sp — Serpentinite
fs — Graywacke
ch — Chert
fgc — Greenstone and chert
gs — Greenstone
m — High-grade metamorphic rocks
Kfss — Sandstone (Late Cretaceous, Turonian?)
Kfm — Metagraywacke (Late and Early Cretaceous)
Kfmc — Metachert (Late and Early Cretaceous)
Kfmg — Metagreenstone (Late and Early Cretaceous)
KJfs — Graywacke and mélange (Early Cretaceous and Late Jurassic)
KJfc — Chert (Cretaceous to Jurassic)
KJfgc — Greenstone and chert (Cretaceous to Jurassic)
KJfgs — Greenstone (Cretaceous to Jurassic)

MAP SYMBOLS

Contact—Depositional or intrusive contact, dashed where approximately located, dotted where concealed

Fault—Dashed where approximately located, small dashes where inferred, dotted where concealed, queried where location is uncertain; orange denotes Quaternary-active fault, magenta denotes Holocene active-fault

Reverse or thrust fault—Dashed where approximately located,small dashes where inferred, dotted where concealed, queried where location is uncertain; sawteeth on upper plate

Anticline—Dashed where approximately located, dotted where concealed

Syncline—Dashed where approximately located, dotted where concealed

Strike and dip of bedding

Strike and dip of bedding, top indicator observed

Strike and dip of bedding, approximate

Overturned bedding

Overturned bedding, top indicator observed

Crumpled bedding

Air photo attitude

Vertical bedding

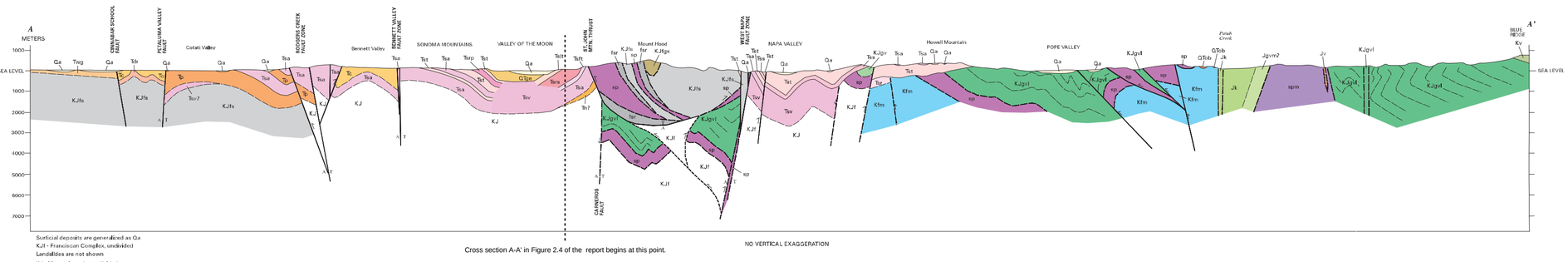
Horizontal bedding

Strike and dip of foliation

Strike and dip of foliation and bedding

Vertical foliation

Strike and dip of joint

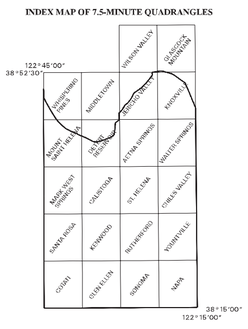


Surficial deposits are generalized as Qa
KJf - Franciscan Complex, undivided
Landslides are not shown
KJ - Mesozoic rocks, undivided
1000 meters = 3281 feet
A/T - Strike-slip offset, A = away from viewer, T = towards viewer

Cross section A-A' in Figure 2.4 of the report begins at this point.

NO VERTICAL EXAGGERATION

INDEX MAP OF 7.5-MINUTE QUADRANGLES

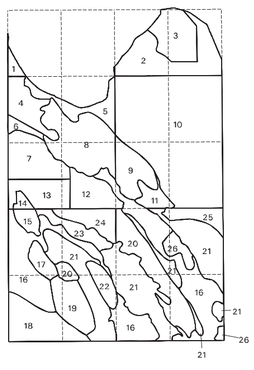


SOURCES OF DATA

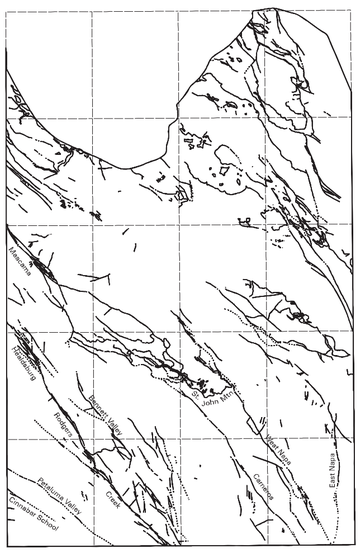
See pamphlet (or digital file cswmmf.pdf or cswmmf.txt) for references cited
Quaternary surficial deposits modified from Sowers and others (1998) and Knudsen and others (2000)

1. Brice (1953), Hearn and others (1995)
2. E.F. Ciancanelli (unpub.), Conrey (1948), Fox and others (1973), Phipps (1984), Hearn and others (1995)
3. Averitt (1945), as modified and reinterpreted by E.F. Ciancanelli (unpub.), Phipps (1984), Hearn and others (1995)
4. Bailey (1946), as modified by E.F. Ciancanelli (unpub.), Fox and others (1973), McLaughlin (1978)
5. Yates and Hilpert (1946), as modified by E.F. Ciancelli (unpub.)
6. E.F. Ciancelli (unpub.)
7. Hurlbut (1948), Fox and others (1973)
8. Fox and others (1973), Crutchfield (1953)
9. Fox and others (1973), with additions from N.L. Taliaferro (unpub.)
10. E.F. Ciancanelli (unpub.), N.L. Taliaferro (unpub.), Wagner (1975) Fox and others (1973), Shouldice (1947), Angel (1948), Clark (1948), Phipps (1984), Hearn and others (1995), A.N. Mosesyev (unpub.)
11. N.L. Taliaferro (unpub.), Fox and others (1973)
12. Johnston (1948), Fox and others (1973)
13. Goss (1948), Fox and others (1973)
14. Huffman (1971), Fox and others (1973)
15. C.W. Jennings (unpub.), Fox and others (1973)
16. Sowers and others (1998), Knudsen and others (2000)
17. Fox and others (1973), C.W. Jennings (unpub.)
18. Fox and others (1973), Weaver (1949), Cardwell (1958), Davies (1986)
19. Fox and others (1973), Huffman (1971), Weaver (1949)
20. Weaver (1949)
21. Fox and others (1973), Weaver (1949), Kunkel and Upson (1960), Cardwell (1958)
22. J.O. Berkland (unpub.), Fox and others (1973)
23. Fox and others (1973), Weaver (1949), Cardwell (1958), R.L. Rose (unpub.)
24. Fox and others (1973), R.L. Rose (unpub.)
25. A.N. Mosesyev (unpub.), Fox and others (1973)
26. Weaver (1949), Fox and others (1973)

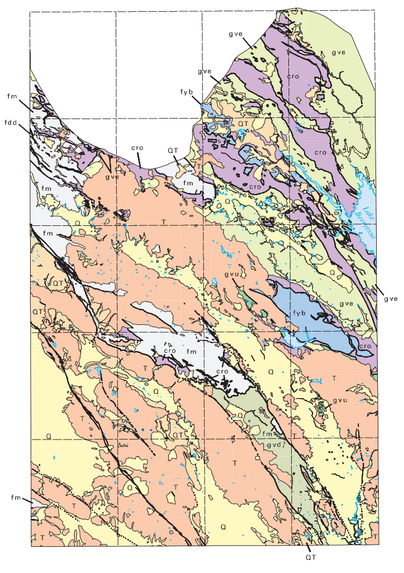
INDEX TO SOURCES OF DATA



INDEX MAP OF FAULTS



INDEX MAP SHOWING MESOZOIC AND TERTIARY COMPLEX TERRANES IN THE STUDY AREA



EXPLANATION OF TERRANE MAP

Q — Quaternary surficial deposits
QT — Quaternary–Tertiary gravels
T — Tertiary volcanic and sedimentary rocks

GREAT VALLEY COMPLEX

gve — Elder Creek terrane
gvd — Del Puerto terrane
gvu — Great Valley complex, undivided
cro — Coast Range ophiolite

FRANCISCAN COMPLEX

fdd — Devils Den terrane
fyb — Yolla Bolly terrane
fm — Mélange

Depositional or intrusive contact

Fault –Dashed where approximated, dotted where concealed

Geologic Map and Map Database of Eastern Sonoma and Western Napa Counties, California

By

R.W. Graymer, E.E. Brabb, D.L. Jones, J. Barnes, R.S. Nicholson, and R.E. Stamski

2007

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Plate 1